

it had freshened into a gale, which was accompanied by intense and suffocating heat, that penetrated houses and even cellars, to the great discomfort of the inhabitants. Streams of heated air could be seen rising from the earth, the roofs of houses and objects near the surface appeared to be wrapped in a whitish glare. At 3.35 p. m. the thermometer stood at 103°.2, the highest temperature ever recorded at this station. Towards evening the heat abated somewhat, falling to 81°.3 at 11 p. m. The gale ended at 6.50 p. m., having reached its maximum velocity of twenty-seven miles from the south between 2 and 3 p. m. At 3 p. m. of the 25th a gale set in from the southwest, and was also accompanied by a high temperature, the maximum being 102°.0.

FROSTS.

During the latter part of the month telegrams were issued by the Chief Signal Officer to observers in Dakota, Nebraska, northern Wisconsin and Michigan, and western Minnesota, predicting frosts in those localities. The telegrams are given below, also the reports of frost, as received from Signal Service and voluntary observers:

The following telegram was sent to observers at La Crosse, Wisconsin; Duluth, Minnesota; Marquette, Escanaba, Alpena, and Mackinaw City, Michigan:

WASHINGTON CITY, August 29, 1886—6.36 p. m.

Cool wave approaching; frosts are indicated for northern Michigan and northern Wisconsin to-morrow night.

Observers at Saint Paul, Minnesota, Huron and Yankton, Dakota, received the following telegram:

WASHINGTON CITY, August 29, 1886—6.40 p. m.

Cool wave approaching; frosts are indicated for Dakota and western Minnesota to-morrow morning.

The observers at North Platte and Omaha, Nebraska, received the following telegram:

WASHINGTON CITY, August 30, 1886—10.16 a. m.

Light frosts are indicated for to-night in Nebraska.

The following reports of frost will serve to show that these warnings were justified:

Richardton, Stark county, Dakota: the first frost of the season occurred here on the morning of the 30th, killing an amount of vegetables.

Huron, Dakota: a heavy frost occurred here on the morning of the 31st; late corn, flax, and all kinds of vines were injured, in many cases destroyed.

Alta, Marshall county, Dakota: corn and other crops were injured by frost on the morning of the 31st.

Fort Yates, Dakota: a killing frost occurred on the morning of the 31st; minimum temperature, 31°.7.

Webster, Day county, Dakota: on the morning of the 31st the first frost of the season occurred, killing corn, vines, etc. Ice formed one-tenth of an inch thick on standing water; minimum temperature, 31°.0. Frost was also reported from Fort Totten and Yankton on the 31st.

Hay Springs, Sheridan county, Nebraska: a very light frost occurred on the 31st in the lowlands six miles south of this place. No injury was done to vegetation. Frost was also reported from Valentine, Nebraska, on the 31st.

Frosts were reported from Michigan, at Reed City, Allegan, Greenville, Hudson, and Traverse City, on the 31st; from Minnesota, at Duluth, Moorhead, and Saint Vincent, on the 31st; from Wisconsin, at Embarras and Fond du Lac, on the 31st.

The following is from the "Evening Wisconsin," of August 31st, published at Milwaukee:

The frost warnings for northern Wisconsin, sent out by the Signal Service yesterday, were verified, as light frosts are reported this morning along the valley division of the Saint Paul road and in the marshes around Berlin. The report from Berlin, received at the Saint Paul railroad office, adds that the frost was light and did no damage. The minimum mercury recorded at the government observatory in Milwaukee was 48°, the lowest since June 8th, when 42°.4 was recorded. The next lowest was 49°, July 18th. At Escanaba, Michigan, 42° was the minimum; at Marquette, Michigan, 45°; at Duluth, Minnesota, 40°; at Saint Paul, Minnesota, 42°; at La Crosse, Wisconsin, 49°; at Des Moines, Iowa, 46°; at Fargo, Dakota, 32°; at Huron, Dakota, 33°; at Saint Vincent, Minnesota, 33°; at Bismarck, Dakota, 34°; at Assinaboine, Montana, 38°.

Frosts were also reported to have occurred in the various states and territories, as follows:

Boston, Massachusetts: light frost occurred in parts of the surrounding country on the morning of the 23d. Considerable damage was done to the cranberry crop in Norfolk county.

Lansing, Michigan: frost is reported as having occurred near Lansing on the 2d, doing considerable damage to corn.

Colorado.—Pike's Peak, 21st.

Connecticut.—North Colebrook, 22d, 23d.

Iowa.—Oskaloosa, 29th, 30th; Dubuque, Bancroft, Cedar Rapids, Independence, Logan, Manchester, and Monticello, 31st.

Massachusetts.—Dudley, 3d; Westborough, 23d.

Michigan.—Marquette, 2d, 18th; Mackinaw City, 4th.

Nevada.—Carson City, 21st.

New Hampshire.—Mount Washington, 7th, 17th, 18th, 21st, 31st; Nashua, 23d.

New York.—North Volney, 6th.

Ohio.—Wauseon, 3d.

Oregon.—Fort Klamath, 9th, 22d, 26th; Lakeview, 17th, 21st, 22d.

Pennsylvania.—Wellsborough and Grampian Hills, 4th; Dyberry, 23d.

TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of water observed at the several stations; the monthly ranges of water temperature; the average depth at which the observations were made; and the mean temperature of the air:

Temperature of water for August, 1886.

Station.	Temperature at bottom.		Range.	Average depth, feet and tenths.	Mean temperature of the air at station.
	Max.	Min.			
Atlantic City, New Jersey	78.0	66.0	12.0	11.5	71.4
Alpena, Michigan	69.6	63.6	6.0	12.2	62.8
Augusta, Georgia	86.3	74.3	12.0	8.3	77.6
Baltimore, Maryland	80.1	75.5	4.6	12.0	77.5
Block Island, Rhode Island	66.6	63.1	3.5	8.5	67.2
Boston, Massachusetts	69.2	59.1	10.1	20.4	67.7
Buffalo, New York	75.0	69.9	5.1	10.8	67.5
Cedar Keys, Florida	80.8	78.7	2.1	8.6	80.8
Charleston, South Carolina	85.1	79.4	5.7	37.9	77.4
Chicago, Illinois	73.2	67.3	5.9	8.6	72.4
Chincoteague, Virginia	84.6	71.0	13.6	3.8	73.2
Cleveland, Ohio	75.0	71.7	3.3	14.0	69.5
Detroit, Michigan	73.7	68.0	5.7	26.7	70.2
Duluth, Minnesota	69.5	58.8	10.7	10.4	63.9
Eastport, Maine	52.8	50.3	2.5	17.2	59.2
Escanaba, Michigan	68.4	62.8	5.6	18.5	62.8
Galveston, Texas	89.1	82.7	6.4	13.6	83.2
Grand Haven, Michigan	75.1	64.0	11.1	19.0	67.1
Indianapolis, Texas	88.7	82.7	6.0	18.0	80.4
Jacksonville, Florida	89.8	83.8	6.0	18.8	84.9
Key West, Florida	67.5	60.2	7.3	10.0	63.6
Mackinaw City, Michigan	86.1	74.1	12.0	12.9	76.5
Marquette, Michigan	69.3	54.6	14.7	12.2	62.8
Milwaukee, Wisconsin	89.5	84.1	5.4	17.6	79.9
Mobile, Alabama	75.4	69.8	5.6	16.9	68.2
New Haven, Connecticut	75.6	66.6	9.0	13.3	67.9
New London, Connecticut	74.7	71.1	3.6	15.6	71.0
New York City	81.2	74.2	7.0	16.1	74.5
Norfolk, Virginia	85.2	75.9	9.3	17.5	80.9
Pensacola, Florida	61.9	54.1	7.8	17.6	64.7
Portland, Maine	74.4	68.0	6.4	51.5	66.8
Portland, Oregon	78.0	71.5	6.5	11.3	70.3
Sandy Hook, New Jersey	74.4	69.3	5.1	13.1	71.8
San Francisco, California	61.3	58.4	2.9	38.0	58.5
Savannah, Georgia	83.7	78.7	5.0	9.7	79.9
Smithville, North Carolina	84.6	78.5	6.1	11.0	77.4
Toledo, Ohio	77.1	72.1	5.0	13.6	69.3
Wilmington, North Carolina	82.1	76.1	6.0	9.7	77.0

* Observations temporarily suspended.

† Record for 24 days.

PRECIPITATION.

[Expressed in inches and hundredths.]

The distribution of rainfall over the United States and Canada for August, 1886, as determined from the reports of about seven hundred stations, is exhibited on chart iii.

The most noted feature in connection with the precipitation of the month is its inequality within small distances, thus at Rochester, New York, the rainfall is 4.31 in excess of the normal, while Buffalo, New York, shows a deficiency of 0.65; Indianapolis, Indiana, excess, 3.42; Cincinnati, Ohio, defi-